

A modeling study based on numerical methods on polarization behaviors of a Solid Oxide Regenerative Fuel Cell

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A Solid Oxide Regenerative Fuel Cell (SORFC) has been characterized in both a Solid Oxide Electrolysis Cell (SOEC) MODE and a Solid Oxide Fuel Cell (SOFC) mode reversibly. Since SORFC is operated under the high operating temperature condition, it has relatively lower Open-Circuit Voltage (OCV) and activation overpotential emerged at electrodes. Thus, experimental studies on SORFC have been conducted actively. In contrast, modeling studies on SORFC have not been proceeded because of different operating mechanisms of SOEC mode and SOFC mode. In this study, effects of the operating condition on the polarization behavior and performance are analyzed by using numerical methods. A numerical model is established from the results of analysis. A numerical model will be validated by comparison with experimental data.